REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(LEAVE BLANK)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	29 April 1999	Professional Paper

4. TITLE AND SUBTITLE

Abstract - Integration of Irene into the Infrared Sensor Stimulator (IRSS) Maritime Modeling Capability

5. FUNDING NUMBERS

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8. PERFORMING ORGANIZATION REPORT NUMBER

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Patuxent River, Maryland 20670-1547

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The Office of the Secretary of Defense (OSD), Central Test and Evaluation Investment Program (CTEIP is tasked with providing a coordinated process for making joint investments in defense T&E to offset the challenges presented by declining investments in test assets and increasing test requirements. Under CTEIP sponsorship, the Navy and Air Force are jointly developing three Joint Installed System Test Facility (JISTF) enhancements that are based on dynamic virtual reality simulation technology. The three enhancements are the Infrared Sensor Stimulator (IRSS), Generic Radar Target Generator (GRTG), and Joint Communications Simulator (JCS). These enhancement will provide each ISTF with the capability to simultaneously test multiple avionics and sensor subsystems installed on an aerospace System Under Test (SUT) (e.g., manned and unmanned aircraft) in a ground test environment. The ISTF enhanced test capabilities will be used to evaluate multisensor data fusion/correlation and subsystems' interoperability for IR sensors, RADAR, GPS, and Communications and Data Link subsystems.

14. SUBJECT TERMS

Installed Systems Testing Infrared Sensors Scene Simulation
Maritime IR Model

15. NUMBER OF PAGES

1

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

Title: **Integration of IRENE into the Infrared Sensor Stimulator (IRSS) Maritime Modeling Capability**

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Abstract:

The Office of the Secretary of Defense (OSD), Central Test and Evaluation Investment Program (CTEIP) is tasked with providing a coordinated process for making joint investments in defense test & evaluation (T&E) to offset the challenges presented by declining investments in test assets and increasing test requirements. Under CTEIP sponsorship, the Navy and Air Force are jointly developing three Joint Installed System Test Facility (JISTF) enhancements that are based on dynamic virtual reality simulation technology. The three enhancements are the Infrared Sensor Stimulator (IRSS), Generic Radar Target Generator (GRTG), and Joint Communications Simulator (JCS). These enhancements will provide each ISTF with the capability to simultaneously test multiple avionics and sensor subsystems installed on an aerospace System Under Test (SUT) (e.g. manned and unmanned aircraft) in a ground test environment. The ISTF enhanced test capabilities will be used to evaluate multi-sensor data fusion/correlation and subsystems' interoperability for Infrared Sensors, RADAR, GPS, and Communications and Data Link subsystems.

The IRSS program was previously briefed at the 1997 and 1998 GTM&V Conference. This paper addresses the integration of the US Navy IRENE IR Maritime Model within the IRSS Scene Generation Subsystem (SGS).

The IRSS system is designed to function primarily on commercial-off-the-shelf (COTS) hardware such as the Silicon Graphics (SGI) Onyx2® InfiniteReality graphics computer. The symmetric multiprocessing capability of the SGI Onyx2 computer gives the IRSS system a multi-channel capability for the simulation and rendering of multi-spectral IR images at high frame rates.

As part of the Infrared Sensor Stimulator (IRSS) development project, Amherst Systems Inc. is tasked with incorporating the capability to render infrared simulations of the Maritime Combat Environment (MACE). To achieve the requirements associated with the modeling and rendering of surface ships, and the dynamic nature of the ocean background, Amherst has integrated the US Navy's maritime model IRENE within the MACE structure. As a result, the integration of IRENE has provided IRSS with the unique capability of rendering surface ships and an ocean background in a real-time high-fidelity IR simulations.

This paper will outline the basic process of the integration of IRENE into IRSS and several of the challenges, issues, and solutions that accompanied this task. This paper's primary focus will be on the process involved with the correct integration/implementation of the validated IRENE thermal model, and the incorporation of an acceptable method for rendering the ocean background in real-time.

KEYWORDS: Installed Systems Testing, Infrared Sensors, Scene Simulation, Maritime IR Model